

DESK & DERRICK CLUB OF CALGARY

SAVANNA CREEK FIELD TRIP

AUGUST 24, 1957

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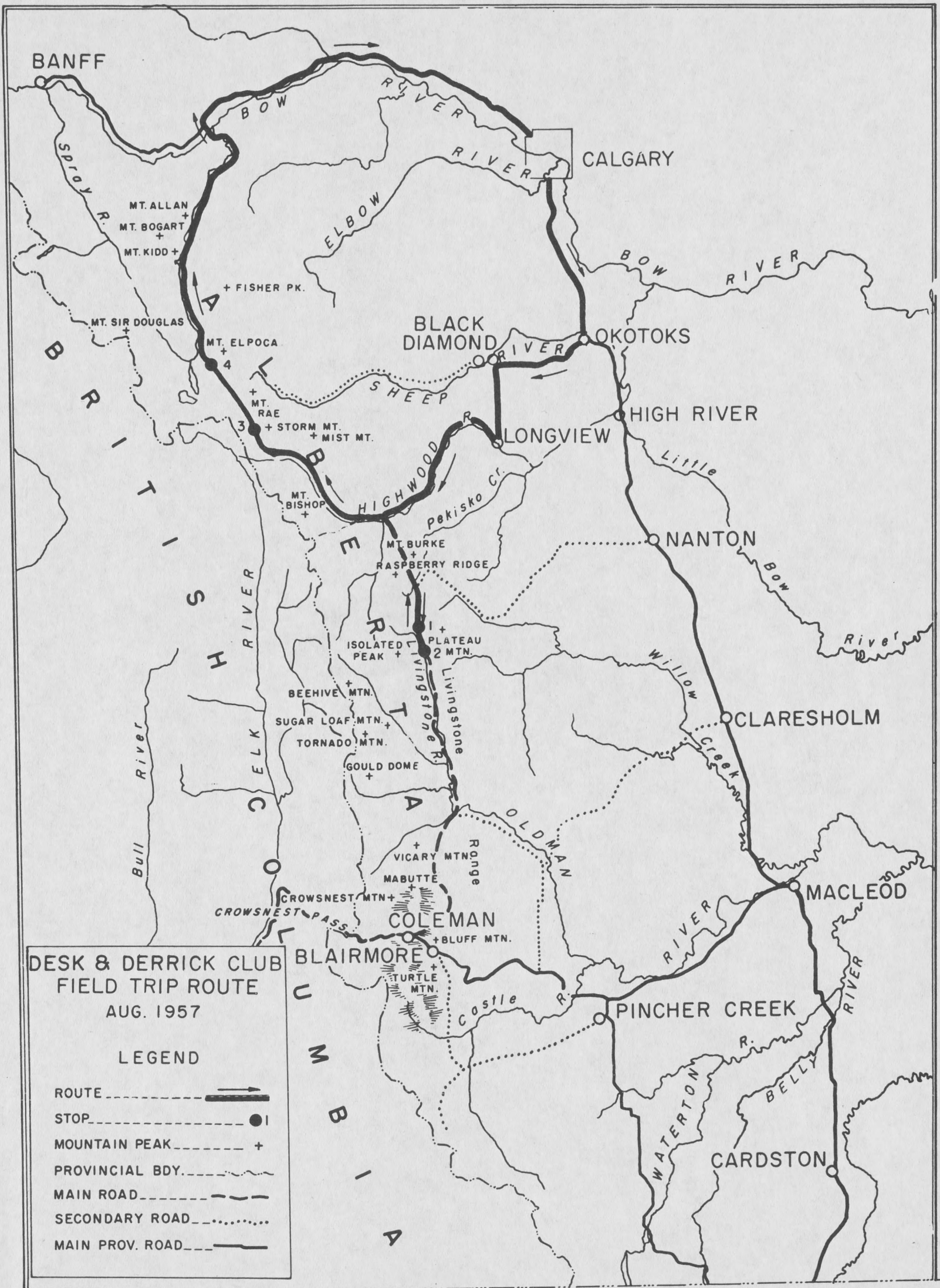
SAVANNA CREEK FIELD TRIP

SATURDAY, AUGUST 24, 1957

We are indebted to the many people who have helped with the preparations for this field trip and with the publication of the guide book.

The members of the A.S.P.G. have been most generous with their assistance and material. Their names are too numerous to mention but particular thanks are due D.L. Potter and W.B. Gallup.

Special thanks to The California Standard Company for supplying materials, printing and binding of this book.



The Western Plains of Alberta are built upon a sedimentary shelf on which paleozoic marine strata, Mesozoic marine and continental beds and some Tertiary continental strata have been deposited. They are bounded on the west by the Rocky Mountains which occupy the site of the ancient Rocky Mountain trench. The Alberta syncline, paralleling the mountains, lies along the boundary between the plains and the mountains, throughout the length of the basin.

Glaciation of the entire plains area has resulted in the development of an excellent, although in some cases rather thin, soil which supports a fine growth of native grasses, although there are practically no trees in the southern part of the province. The geological formations underlying the drift control the topography, which has been somewhat modified by glaciation. The wall of the Rockies to the west separates the arid to semi-arid plains from the humid to semi-humid mountain and coastal area.

In our trip today through the oilfields of Turner Valley, through the beautiful Highwood country to the grandeur of the Coleman-Kananaskis valley, we cover typical areas of Alberta's topography.

For the purpose of this trip, Mile 0.0 is at the junction with the Highwood Road at the town of Longview.

0.0 Junction with Highwood Road at Longview

1.6 Cattle-guard (Texas Gate)

3.0 Fireguard Coulee on right. Probably related to late Pleistocene or early Recent Highwood River drainage. The highest terrace along the right rim of the valley is fine material as compared to the cobbles of the lower terraces. This upper terrace from its elevation appears to be pre-Fireguard Coulee drainage.

5.0 Upper Blairmore sandstone on right containing pebbles indicating source in the Selkirk Range. Ranch at right is O H, formerly the Rio Alto, one time site of Northwest Mounted Police Outpost

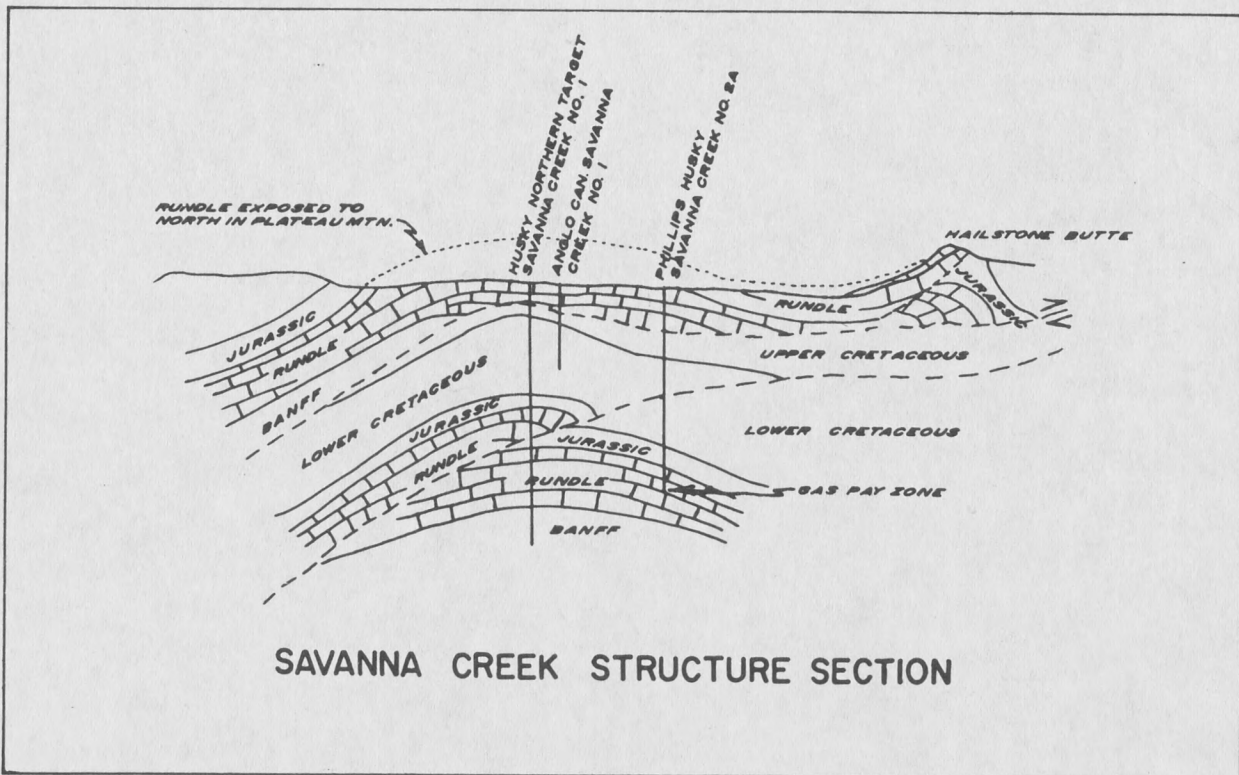
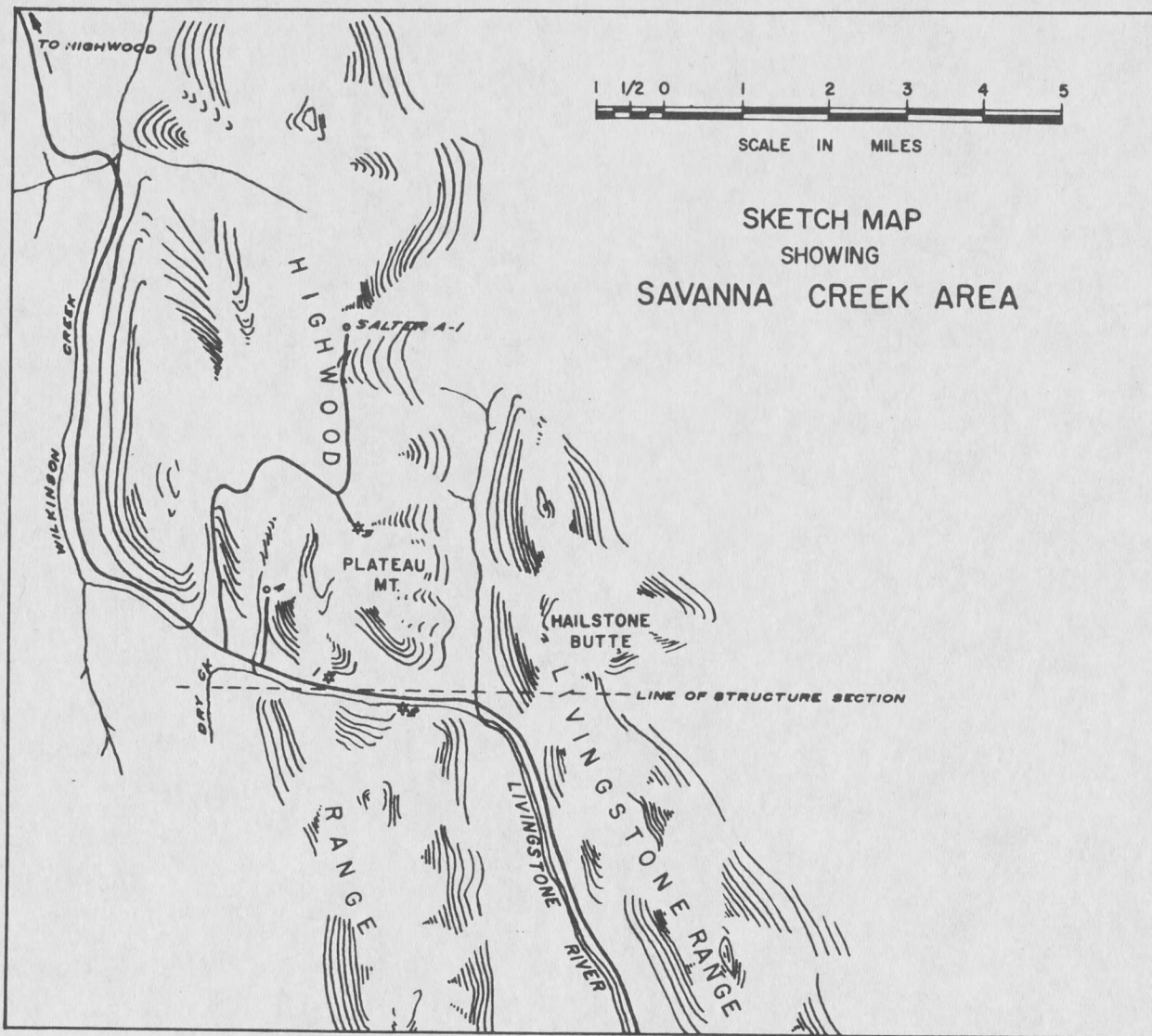
5.1 Bridge

5.5 At 3 o'clock is repetition of Upper Blairmore sandstone. Low area between outcrops across valley is Blackstone formation. The Jumping Pound sand lying 200' above the base of the Blackstone, and the Blackstone-Blairmore contact can be observed in the river canyon at this point

- 7.8 Wapiabi shale and Cardium sandstone on left in river
- 8.8 Y Cross Ranch on Sullivan Creek. Note sandstone repeated by faulting across bridge on right.
- 9.0 Graves of three Sullivan children on left of road. Died of diphtheria May 3rd, 6th and 16th, 1894.
- 10.1 Cattle-guard
- 11.2 Buffalo Head Ranch
- 12.4 Belly River strata in river to left
- 13.0 Flat Creek. Bridge rests on lowermost Belly River strata, Wapiabi shales downstream. Road to the right before the bridge leads to headwaters of Flat Creek in the Highwood mountains.
- 14.0 Stampede Ranch on right
- 15.2 Cattle-guard
- 15.3 Bar U summer camp on right
- 16.5 Belly River on river to right. Basal Belly River forms skyline to left. Hunt ford and Stony reserve on left.
- 17.5 Cardium on left of road
- 18.0 Gate
- 18.4 Deep Creek bridge, Wapiabi formation
- 19.8 Cardium sandstone
- 19.9 Upper Alberta (Wapiabi) shales in road cut
- 20.1 Cattle-guard
- 21.1 Marsden Creek in Blackstone shales
- 22.2 Boundary of Forest Reserve, Blairmore
- 23.2 Fir ridge on right. Still Blairmore
- 23.3 Fir Creek, one of the few places east of the divide where these trees are abundant
- 24.1 Spray River-Rundle sequence repeated by faulting on right
- 24.4 Cataract Creek trail on left

- 24.5 Camp ground on left
- 25.7 Rundle dolomite and limestone in road cut and cliffs above. This same section appears in the Oldman River Gap. Note Syringoporo zone.
- 26.4 Gate at Sentinel Ranger station
- 27.1 Cattle-guard
- 27.3 Basal Blairmore conglomerate underlain by Kootenay outcrops in road cut. Same sequence is exposed across river. Note underlying coals
- 27.9 Junction with Kananaskis road, turn left. From the Longview cut-off the road progresses along beds of Blairmore strata for a distance of some 15 miles. To the left is the Livingstone Range (front range) and to the right are rocks of Upper Cretaceous age. This general area is the scene of the great Highwood fire of 1936 and young pine is slowly replacing the burnt timber.
- 28.2 Highwood River bridge. From this point to Etherington Creek bridge the road is on Blairmore beds
- 30.3 Mile Post 65
- 31.5 Etherington Creek Bridge
- 32.8 Indian shacks. For next three miles the road runs along strike near the Fernie-Blairmore contact.
- 35.3 Mile Post No. 60
- 36.1 Cataract Creek Bridge. Note Mount Burke approximately three miles to the east in the front range with forestry lookout on top. Up Cataract is a view to the High Rock Range and Great Divide, boundary between Alberta and British Columbia. For the next six miles the road traverses Blairmore beds.
- 36.3 Cataract Creek forestry camp shelter on the right.
- 37.5 Wilkinson Creek Bridge. Blairmore strata on left.
- 40.0 Mile Post No. 55
- 41.6 Wilkinson Creek Bridge. Blairmore.
- 44.2 Wilkinson summit, elevation 6,544'

- 45.3 Mile Post 50
- 45.6 Location on left of Anglo Canadian Savanna Creek No. 1
- 46.5 Texas gate
- 46.6 Artesian spring on left, good drinking water. Plateau Mountain on left.
- 48.0 Road junction on left to Husky-Northern-Target Plateau No. 1
- 53.5 Top of Plateau Mountain - drilling rigs.



SAVANNA CREEK GAS FIELD

The Savanna Creek gas field is located approximately 100 miles by road southwest of Calgary, approximately 50 miles north of the Crowsnest Pass, eight miles east of the continental divide and B.C. border, and three miles west of the Rocky Mountain front. It lies, therefore, within the mountain belt rather than in the foothills and is the first production established within the mountain ranges in Canada.

The dominating feature in the Savanna Creek area is Plateau Mountain which is a broad elongated dome, essentially flat on top and with deep glacial cirques incised into its sides. It is bounded on the east by the Livingstone River drainage valley and on the west by the Wilkinson Creek drainage. Elevations in these drainages range from approximately 6500 feet downward and the elevation on Plateau Mountain at its highest point is approximately 8210 feet. Plateau Mountain itself is terminated with a cliff face on the south by the Dry Creek drainage and on the north by the Salter Creek drainage. The mountain is approximately five miles long and at the present time the Phillips-Husky-Northern-Target team is drilling on the extreme north end at the Salter "A" #1 well and has recently completed a producer at the Savanna Creek #3-A well, two miles north of the discovery at Savanna Creek #1. The wells drilled on top of Plateau Mountain are the highest in Canada and among the highest in North America. The road constructed to its summit allows motor car travel with moderate to easy grades and is the highest existing road in Canada at the present time.

The discovery of a large gas reserve in the Savanna Creek area has extended interest and exploration beyond the foothills and well into the mountains where drilling has been shown to be feasible, although attended with the crooked-hole, access, and supply problems connected with mountain drilling. Interest in Savanna Creek as a potential producing area dates back to 1936, at which time Mr. J.S. Irwin made a reconnaissance survey of the Plateau Mountain area. As a result of his investigations Anglo Canadian Oil Company drilled their Savanna Creek #1, approximately a quarter mile east of the later discovery well. This well was carried to a depth of 3370 feet where it was abandoned after drilling through a major fault from Mississippian to Cretaceous at 140 feet and penetrating into the Blairmore Lower Cretaceous section with no encouragement.

In 1952 Husky Oil & Refining Ltd., together with Northern Natural Gas Company and Target Petroleum Limited, drilled their Savanna Creek #1 well. This well encountered the Mississippian-Rundle limestone at 4400 feet and also found an encouraging show of gas in the formation. However, the potential porous zones

of the lower part of the Rundle were absent due to a second major thrust fault which caused a repeated section of the Cretaceous and Jurassic formations. The well was suspended at a depth of 5575 feet and at a later date Phillips Petroleum Company joined the Husky-Northern-Target group and resumed drilling in an attempt to explore a third possible Mississippian-Rundle occurrence where the potential porosity zones might be present. The group was successful in finding a complete section of Mississippian-Rundle in the so-called third fault block and also found it gas-bearing. During the drill stem and production tests the well flowed large volumes of dry gas, with a relatively high hydrogen sulphide content, from beds partly equivalent to the Turner Valley producing formations and also, in all probability, to those producing at Pincher Creek and, of late, in the Waterton Park area where Shell has made a Mississippian discovery.

Following the discovery, a step-out well was drilled one mile east and a third well has been drilled approximately two miles north; both have been successful and indicate a substantial gas reserve in the field. At the present time two additional wells are drilling: (1) the Salter "A" #1 mentioned previously and (2) the Savanna Creek #4 which is a west flank well being drilled to test the middle fault block as well as the discovery producing zone. Preparations are also being made to drill a development well approximately one mile south of Savanna Creek #1 and two other locations on Plateau Mountain are now ready for drilling and waiting on rigs.

Marketing of the gas and products from the Savanna Creek field is being considered at the present time by a number of pipeline companies; however, Phillips, Husky and Target have contracted their gas to Westcoast Transmission for delivery into the Pacific Northwest Pipeline in the Spokane area. Provided this pipeline becomes a reality, it will be laid from the field to a point in the Crowsnest Pass area and then southward to the U.S. border. A recent announcement proposes the construction of a sulphur extraction plant in the Crowsnest Pass at Coleman which will scrub the sour sulphur gas being produced and result in production of a considerable volume of native sulphur for marketing.

Drilling operations in the area have been carried on continuously since the discovery and due to the terrain major road construction projects have been necessary; during the winters serious problems of road maintenance, water hauling, heating, snow removal, etc., have been encountered. Life on Plateau Mountain at work or during time off is a continual battle with the elements, particularly the wind, snow, cold, and fog or clouds. Wind velocities are nearly always high and on occasion exceed 100 miles per hour. It is interesting to note that conditions

on the mountain are usually worst when Calgary and the Plains are enjoying a warm chinook. Snow, sleet and hail are common occurrences each week in the year.

Structure in the Savanna Creek area is a complex of thrust faults and folding involving essentially the same formations that are penetrated in wells drilled in the foothills or on the plains to the east. The normal section is composed of sands and shales of the Upper and Lower Cretaceous which are divided into the Wapiabi, the Cardium, the Blackstone, the Blairmore and the Kootenay formations in descending order; the black and brown Fernie shales of Jurassic age; and the underlying Paleozoic. At the top of the Paleozoic section the Rocky Mountain formation is a thin sand or quartzitic zone which lies unconformably on the Mississippian. The Mississippian is made up of the Rundle group, including the Tunnel Mountain, Mt. Head and Livingstone formations which are primarily limestone and dolomite and these are immediately underlain by the Banff formation composed of dark brown and grey limes and much black limy shale.

The producing zone on the Savanna Creek structure consists of inter-crystalline and vugular porosity in portions of the Mt. Head and Livingstone which is improved to a great extent by considerable fracturing and brecciation. Some cores taken in the various wells have exhibited long open fractures which, undoubtedly, enhance the reservoir from a producing standpoint.

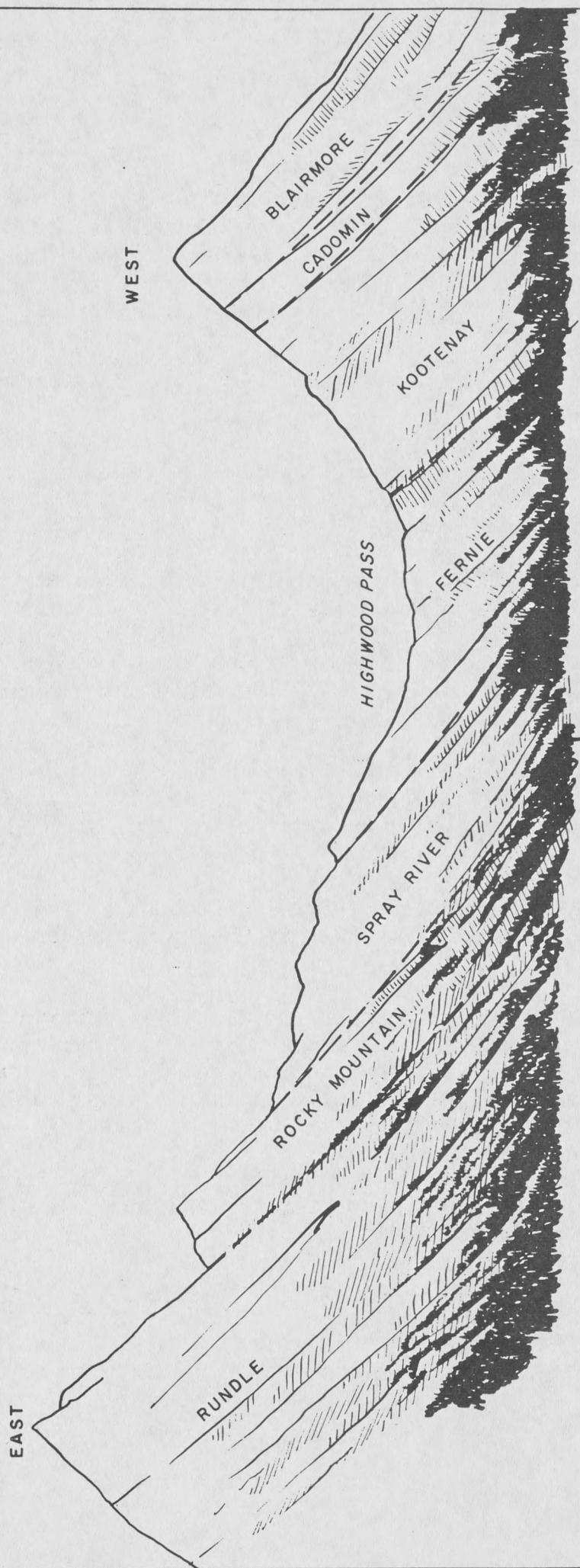
The Exshaw formation occurs at the base of the Banff and is a thin black shale overlying the Devonian sediments.

The Savanna Creek #3-A penetrated the Devonian limes and dolomites and at its final total depth of 13,798 feet it crossed another major fault from Devonian back into Mississippian-Rundle beds. No well has penetrated beyond the upper part of the Devonian in the immediate vicinity.

Drilling to date has indicated the presence of three and possibly four major fault blocks superimposed one upon the other with varying thicknesses of Paleozoic and Mesozoic rocks being contained in each block. Plateau Mountain itself is a portion of one of these fault blocks consisting of Mississippian-Rundle limestone. In general, the structure may be regarded as a simple anticline in which these numerous fault block slices have been folded. Numerous complexities as to detail of minor faulting are evident, especially in the Cretaceous and Jurassic beds and, no doubt, many unsuspected structural features will be revealed with additional development drilling. Drilling subsequent to the discovery has shown the structure to be a narrow north-south trending anticline, with steep dipping flanks, and in the third block Mississippian producing zone a vertical gas column of approximately 1500 to 1800 feet has been proved.

Maximum gross pay section in any one well is approximately 1100 feet.

The Savanna Creek #2-A well established a gas/water contact on the east flank of the structure at a datum of approximately -2100. To date a water line on the west flank has not yet been ascertained although, in all probability, it will be the same as that on the east.



HIGHWOOD PASS SECTION

Facing south, the mountains on the left are the Highwood range. From left to right the formations shown on the above sketch section may be identified by color as follows: the blue-grey rocks on the peaks are the Rundle; overlying the Rundle is the Pennsylvanian Rocky Mountain formation which is seen here in the greenish-weathering "flatirons" in the dip slope of the Mountains; the buff beds at, and just above vegetation are the Spray River formation. The Fernie-Kootenay sequence underlies the saddle of the pass and the saddle immediately to the south. The ridge on the right and straight ahead are formed by the resistant Cadomin and Blairmore conglomerates of lower Cretaceous age.

STOP NO. 1 PLATEAU MOUNTAIN

STOP NO. 2 LUNCH

STOP NO. 3 HIGHWOOD PASS. Stopping at Mile 97 in the Highwood Pass. This pass has been gained by following Storm Creek. The names applied to the mountains here, Storm and Mist, as well as Thunder and Tornado to the south, illustrate the variable weather conditions of the area.

The descent from the pass is made along the Pocaterrea Creek towards the Kananaskis Valley.

The road here is at an elevation of 7,239 feet. This was the highest engineered road in Canada until the road to the top of Plateau Mountain was built.

STOP NO. 4 ELPOCA CREEK. From the bridge crossing at Whiteman Creek you may look across the valley filled with the soft Mesozoic sands and shales, to Mount Warspite, flanked on the south by Mount Invincible, and on the north by Mount Black Prince. Lower Kananaskis Lake lies at the foot of Mount Invincible and Mount Indefatigable.

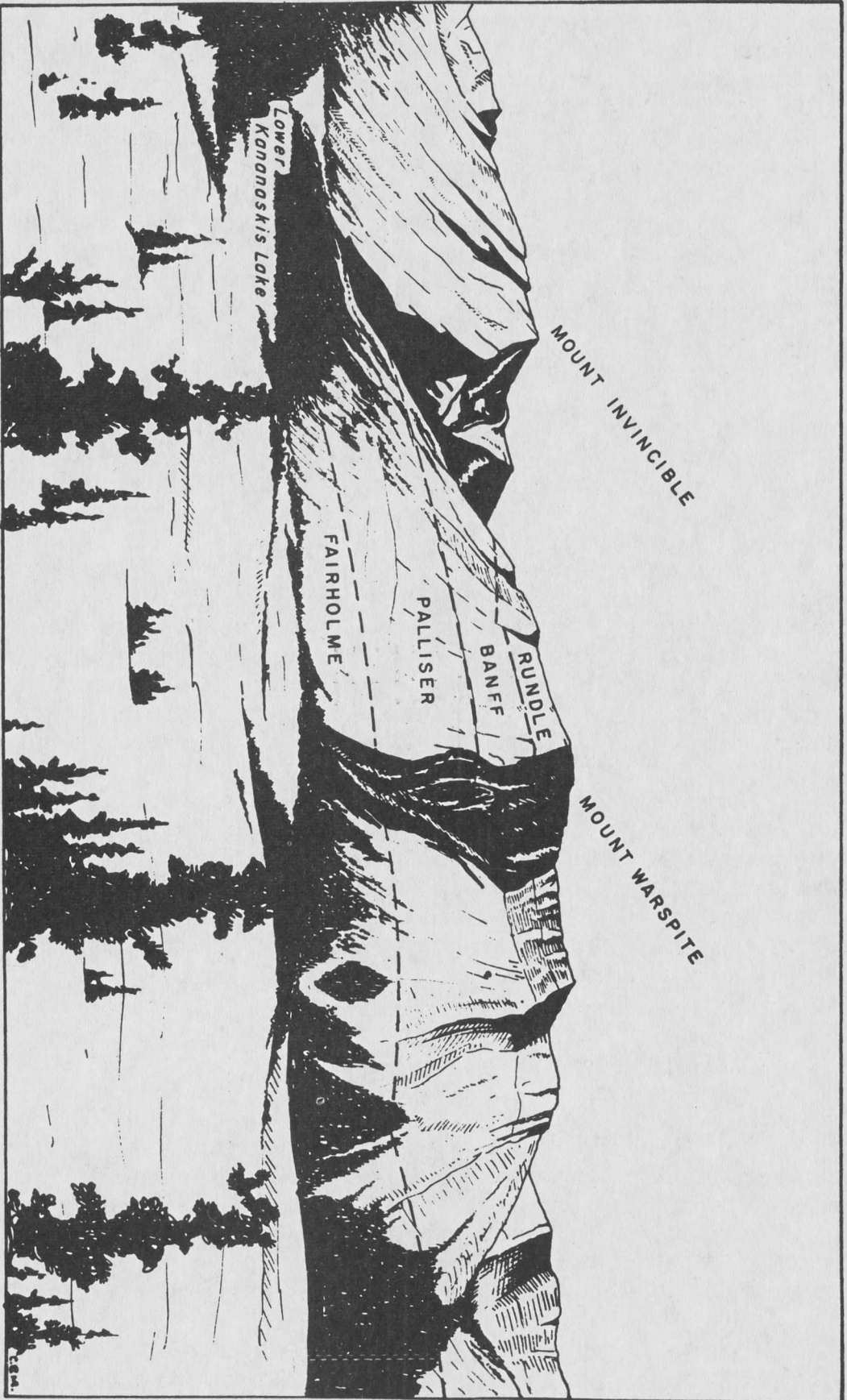
Many of the names of the mountains in this area are derived from ships and men who fought at the battle of Jutland. The silhouettes of these mountains are typical of many found in the Banff Area.

From the topography, the result of differential weathering of the rocks, the Paleozoic formations may be identified from a distance.

At the summit of Mount Warspite is the cliff forming Rundle formation. This is the formation that caps Mount Rundle on the Banff Golf Course. It is from a porous zone in this formation that the oil at Turner Valley and the gas at Jumping Pound are produced.

The gentle slopes at the base of these cliffs are Banff formation outcrops, composed of softer argillaceous limestones and shales which are more easily weathered.

Beneath is the Devonian Palliser formation, which forms the precipitous eastern mountain faces in this general area. On the surface of the brown to buff mottled dolomite limestones which compose this formation characteristic tracery is often found. From a reef in this formation, Shell is producing sulfurous gas at Okotoks.



At the base of the mountain, partially covered by talus, the broken rock along the slopes, is the Fairholme formation. The reefs in the green shale basin were growing at the time the tight bedded dolomite in this area was being deposited in a much shallower quieter sea.

These Paleozoic rock have been thrust over Cretaceous and Jurassic shales and sandstones. The average dip of the thrust fault is 45° away from the viewpoint. Flying over the area you can see that Mount Warspite and Mount Invincible are aligned with the Goat Range and Sulphur Mountain of Banff, and form part of the same thrust sheet.

There are no more scheduled stops but around the Ribbon Creek Area there are places of interest. The Kananaskis Valley at this point is underlain by an assemblage of Mesozoic strata similar to those occurring in Bow Valley at Canmore or Anthracite. Of particular interest are the coal seams which outcrop on the lower slopes of Mt. Allan. They are an extension of the same coal measures mined by Canmore Coal Co. beneath the Three Sisters. Prospectors since the turn of the century had opened numerous coal seams in this area but it was not until 1947 that operations on a large scale were undertaken. Brazeau Collieries opened a strip mine on the lower slopes of Mt. Allan and in 1948 underground mining was commenced. Operations have been suspended during the last few years because of high transportation costs. The coal was hauled by truck to the rail near Seebe.

During World War II inmates of the Prisoner of War Camp at Seebe were employed cleaning up fire-killed timber for mine props. As a result of these operations, numerous trails and access roads can still be seen on the lower slopes on both sides of Kananaskis Valley.

To the west at Wasootch Creek can be seen Mount Lorette. The section at the top is Rundle limestone, underlain by Banff. The underlying Devonian section, Exshaw, Palliser and Fairholme, and the Lac des Arcs fault at the base are not visible from here. They are concealed behind the closer ridge in front of it.

Immediately to the right is another faultblock. At the base of the massive light gray cliff forming Palliser is the Exshaw fault, or rather the continuation of the fault by that name in the Bow Valley. The Palliser is seen twice at the skyline. It is topped by Exshaw shale and soft rusty weathering Banff. The latter shows as a smooth horizontal slope on the skyline.

To the far right another faultblock is visible. The base of it is concealed and further to the right. Here a continuous, though locally contorted, section from Palliser to lower Rundle is exposed.

Just before leaving the Kananaskis Forest Reserve one can see on the left the Barrier dam and on the right a Forest Experimental Station which is a converted prisoner of war camp. Cambrian rocks form the cliffs on the west of the dam. The prisoners were employed in projects related to the forest industry.

32 miles from Cochrane the road to Seebe dam is on the right. Mt. Yamnuska is on the left. The Seebe dam is located on the Bow River at a point where channelling is caused by the sandstones of the Bighorn (Cardium) formation. Exposure of the Bighorn may be observed below the dam.

In another 12 miles the entrance to the Stony Indian Reserve is on the right, and in another 8 miles the road crosses the Ghost River Bridge. The Ghost River dam is on the right at this point.

Four miles west of Cochrane the faulted zone of rocks which lies in front of the main mountain thrust begins. The rocks are of Cretaceous age.

Just west of Cochrane on the left of the road is an old brick kiln.

Going up the Cochrane Hill, on the left, rocks of Edmonton-Paskapoo age have been bared. The road proceeds to Calgary along a pre-glacial plain.

This field trip has passed through a portion of the mountains made accessible by forestry roads engineered and built in the last few years by Eastern Rockies Forest Conservation Board.

ALBERTA IN THE BEGINNING

The Plains Indian sign for "a long time ago" is made by drawing the right hand across in front of the body from left to right, holding the fingers extended in a drawing or plucking motion, signifying man's effort to reach into the depths of his antiquity and bring to light the ways and affairs of the people of those days. So it is with us. There were men on these plains and in the hills before our Indians, a people who had probably migrated here from Asia through a corridor between the Rocky Mountain and Keewatin ice sheets, but little is known of them. Ethnologists have not yet plucked the whole story out of the past. Even our present natives, relatively rank newcomers, did not bring much of their history with them. Two linguistic stocks were originally represented, the Uto-Aztecan Shoshoni from the south, and the Algonkian Blackfoot Confederacy from the northeast. The Kootenai from the west were also Algonkian. Later Assiniboines filtered through the Foothills to become our present day Stonies, contributing the widespread Siouian tongue of the southeast. And so came people of these outstanding aboriginal linguistic stocks of the continent to joust for lands drained by the upper waters of the South Saskatchewan, then known as the Stag River.

About 250 years ago, the Blackfoot, freshly arrived on foot in the buffalo country from the hungry eastern forests, found themselves hard pressed by the mounted Shoshoni, also moving into the valley of the South Saskatchewan. They were aggressive, yet even the greatest of their foot soldiers were barely able to hold their own against the Shoshoni Mounted. So a Blackfoot war chief secured the services of 10 Crees armed with rifles and with enough ammunition for about 30 rounds. Rifles were passed up and down a long line by runners, so that all one afternoon widely spaced shots were directed at the Shoshoni who withdrew from this apparently unlimited supply of arms and ammunition.

Fresh from this triumph, the Blackfoot stole horses from tribes to the southwest and rapidly became the most aggressive of the Horse Indians. The Kootenais, then living in the Foothills, were driven back into the mountains; the Shoshoni to their former haunts far to the southwest. They also turned on the Crees who had helped them in the past. In truth "they were against every man and every man was against them".

It was into this scene of strife that Anthony Henday strode one day in 1754 to invite the Blackfoot Nation to come to Hudson's Bay to trade. About 60 miles northeast of Calgary he came upon a Blood camp of 322 lodges. He was treated royally although his invitation to come to the Bay to trade was declined for the stated reason that the white man had nothing that the people of the prairie wanted - the buffalo gave them everything. Henday's description of these people is worth quoting.

"I took a view of the camp. Their tents were pitched close to one another in two regular lines, which formed a broad street open at both ends. Their horses are turned out to grass, their legs being fettered; and when wanted are fastened to lines cut of Buffalo skin, that stretches along and is fastened to stakes drove in the ground. They have hair halters, Buffalo skin pads and stirrups of the same. The horses are fine tractable Animals. The Natives are good Horsemen, and kill the Buffalo on them. These Natives are drest much the same as the others, but were clean and sprightly. They think nothing of my tobacco, & I set as little value on theirs, which is dried Horse dung. They appear to be under proper discipline & obedient to their Leader, who orders a party of Horsemen Evening and morning to reconoitre & proper parties to bring in provisions....Saw many fine girls who were Captives; and a great many dried Scalps on poles on and before the Leaders tent. They follow the Buffalo from place to place; and that they should not be surprized by the enemy, encamp in open plains. Their fewel is turf & Horse-dung dried; their clothing are finely painted with red paint, like unto English Ochre; but they do not mark nor paint their bodies".

Henday returned to Hudson's Bay, where he was hounded out of the service of the Company of Adventurers as a liar for his stories of Indians on horse-back.

In 1792 Peter Fiddler's party passed near the junction of the Bow and the Elbow, and then to High River, as he tried to establish trade with the Blackfoot. David Thompson followed in 1802, trading with the people and mapping the country. Peigan Fort (Old Bow Fort) was built near Mt. Yamnуска in 1832, the first walls built where only lodge poles had stood before. It was abandoned in 1834. The American Fur Company built a fort at the confluence of the Elbow and Bow Rivers in 1833.

Smallpox epidemics put in an appearance. Rum was being used in trade. The horse and rifle increased the horrors of the inter-tribal wars and hastened the end of the buffalo. The wild west was beginning; free-lance whiskey traders were trading watered alcohol for fur, robes, buffalo, horses and women. Blackfoot were raiding south every spring to relieve white trappers on the upper Missouri of their winters catch.

The Bloods and Peigans were having trouble with the Kootenai, who swooped down from the mountains and wrought havoc among the Plains Indians. As a result the Bloods and Peigans closed the mountain passes to Whites to prevent the Kootenai from obtaining rifles. The Kicking Horse, Kootenai and Crow's Nest Passes were closed for 70 years until the signing of Treaty No. 7 in 1877 at Blackfoot Crossing gave the whites access to all of southwestern Alberta.

By the late 1860's the forts of Whoop-up, Slide Out, Freeze-Out and Stand-Off were flourishing, trading Na-pee-okee (one part alcohol to eight parts water) to the Blackfoot. Smallpox broke out again. The Cree decided to even old scores while the Blackfoot ranks were debauched. They sent 700 warriors against them on the Belly River, but the Blackfoot were not as weak as they had thought. The squaws helped their men to gather a harvest of 300 Cree scalps, with a loss themselves of approximately one third that number.

During the next ten years the Canadian authorities worked for a treaty with the Blackfoot Nation. Finally, in 1876 they signed Treaty No. 7, and thus the Blackfoot lost their old freedom. One of the promises given by the police was that whiskey traders would be driven from the country.

In the late 1860's a few placer miners from the Cariboo gold fields came drifting into the area. It was a hazardous business, with the Bloods eager for the white man's hair, whatever his business in the country. One of the prospectors made it to Fort Benton with \$70,000 in gold and a rather addled mind. He was Mark Lemon, and had killed his partner, Black Jack, with an axe while the latter slept. While at Benton, Lemon undertook to show a Presbyterian Minister the source of his gold. However, on the trip out from Benton, Lemon went completely mad and died on the Milk River ridge. The Stonies, apparently, either witnessed the murder or found Black Jack's body, and their chief, Bearspaw, declared the area taboo. Stonies who are alive today name the headwaters of the Oldman River as the scene of the murder and the region of the taboo. Such was the source of the legend of the Lost Lemon Mine, and to this day people who should know better are looking for it.

Fort Macleod and Fort Calgary were established in 1874 and 1875 after a reconnaissance trip by the police under Colonel French. The police rid the country of the whiskey traders, informed other undesirables that it was "be good or be gone", and exerted a strong influence on the Indians. Crowfoot and Colonel Macleod worked closely together; it is noteworthy that Blackfoot killings and thefts after the arrival of the police were by young bucks out to make a name for themselves and were not according to tribal policies. By 1895 the police had gained such authority that they were able to forbid certain religious rites, such as the Sun Dance.

The country's adolescence was not without proper guidance. Geologists arrived early. Captain Palliser came west in 1857 to conduct surveys of the Bow River and adjacent regions. With him was Dr. James Hector, geologist. David Thompson's reconnaissance maps were available for their guidance. Palliser wintered with the Blackfoot as a guest of Old Sun, the head chief, in order that the warriors might know him and permit him to conduct his surveys unmolested. In 1874 George Mercer Dawson, botanist and geologist to Her Majesty's British North American Boundary Commission arrived.

His descriptions of the general geology and physiography of the southern plains of Alberta needed little revision by later workers. Dawson returned to Bow and Belly Rivers in 1881 accompanied by R.G. McConnell, whose geological explorations on the southern plains rank second only to Dawson's.

Outstanding among the men who followed Dawson and McConnell is D.B. Dowling. His comments on the upper Oldman are of interest. "The Oldman River with the upper part of South Saskatchewan occupies the centre of a wide depressed area, which runs across the entire district with a course a few degrees north of east. This important feature originates at the mountain precisely opposite the remarkable gap in the Paleozoic rocks of the outer ranges, and both are doubtless due to some general structural circumstances not yet clearly understood."

Cattle began to replace the buffalo as surely as the Whites had replaced the Indians. In 1878 Fort Walsh and Fort Macleod traded 30,000 buffalo robes, and only 14,000 the following year. Indians held the remaining buffalo in the Judith basin and the last great slaughter was under way. Great warriors who were accustomed to eating up to ten pounds of buffalo meat a day now snared gophers and rabbits for sustenance. In the dire need they turned to the cattle now coming into the country, and to begging at forts.

Indians and storms nearly put the cattlemen out of business before they were well started. The ranchers got little sympathy from the police, who held that the country was not yet ready for ranching and forbade the ranchers to take the law into their own hands in the matter of reprisals against the Indians. It later turned out that while Indians were blamed for the disappearance of each missing critter, such depredations only accounted for a small portion of the loss. Rustlers, bad weather and careless herding accounted for the disappearance of many.

By 1883 there were 25,000 head of range cattle in Alberta south of the Bow. The railroad came to Calgary in 1883, causing the disappearance of the bull trains on the Fort Calgary-Fort Macleod-Fort Benton trail. Many of the ranches in and around the Porcupine Hills were founded in the early 1880's - the Cochrane, the Walrond, now known as the "Waldron" or "W.R.", the Bar U and the A.7, which was founded by A.C. Cross, son-in-law of Colonel Macleod and now the oldest ranch under one name and one brand in the province.

The Riel rebellion in 1885 caused a ripple of excitement in southern Alberta. Under the guidance of Crowfoot, on Colonel Macleod's advice, the Blackfoot Confederacy stayed off the war trail. By the early 1890's railroads were built to Edmonton and Fort Macleod from Calgary, and thus brought the end of the stage coaches on those trails. For 25 years the

cowboy reigned supreme on the open range. He worked long and hard on the open prairies, and his capacity for boisterous fun in town considerably enlivened the towns of Calgary, High River and Fort Macleod.

In 1885 the greatest roundup ever to take place in Western Canada was held in southern Alberta. There were 100 men, 15 wagons and 500 saddle horses. Twenty years later the homesteader's barbed wire had taken over the open range.

The history of the building of southern Alberta is still being written, and it is a stimulating and fascinating one. Great irrigation schemes have turned the bare plains into gardens; cities and towns dot the land; a friendly and industrious people populate it. The prairie would scarcely be recognizable to David Thompson or Old Sun, chief of the Blackfoot of 100 years ago. But the old Peigans would find the Foothills relatively unchanged. Even now on a summer's afternoon it is not difficult, seated on a high grassy ridge, to visualize a great Blackfoot camp on the plain below surrounded by countless ponies, the drying racks red with meat and the air heavy with diamond willow smoke.

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